



Addition of Liquids to MSWLFs under EPA's RD&D Rule Guidance Document

This guidance document provides direction for the preparation and implementation of the Research, Development, and Demonstration (RD&D) part of the facility operations plan (FOP) for municipal solid waste landfills (MSWLFs) that will be adding liquids to the waste in the landfill.

Background

Federal and State regulations written in the 1990s for MSWLFs include standards to minimize the amount of liquids entering the landfill. Since that time, the concept of adding liquids to MSWLFs to enhance the decomposition and stabilization of the waste has gained acceptance. In 2004, EPA promulgated the RD&D permit rule (40 CFR 258.4). The rule allows landfill facilities to utilize innovative methods that vary from the run-on control systems, liquids restrictions, and final cover criteria prescribed by federal regulation if these variances are determined by the director of an approved state program to be at least as protective as the federal criteria.

In 2009, the Kansas Department of Health and Environment (KDHE) received approval from EPA to implement the RD&D rule. KDHE has issued permits that include variances to the solid waste regulations under the authority of [K.A.R. 28-29-2](#). This regulation requires reevaluation of the variance every two years but does not put a limit on the total length of the variance. To remain as stringent as the federal rule, the Bureau of Waste Management (BWM) issued Policy 2009-P1 to set a 12-year limit on RD&D variances issued by the KDHE. In 2016, EPA promulgated a final rule that increased the previous 12-year total RD&D permit term to 21 years. This change was reflected in BWM's revised [Policy 2009-P1](#).

Acceptable Liquids

The source of liquid can be either on- or off-site. The liquid must not be a regulated hazardous waste, must be compatible with the municipal solid waste (MSW) in the landfill, and placement of the liquid in the landfill must not cause harm to human health or safety or the environment. Liquids that may be used as part of a liquids addition program include, but are not limited to: municipal and industrial wastewaters; irrigation return waters; and typical natural resources such as local precipitation, and surface and ground waters. Examples of unacceptable liquids include waste quantities and qualities which could inhibit MSW stabilization, retard methane production, or cause ignition of the MSW.

Liquid wastes may be placed in the landfill only with a special waste disposal authorization issued by KDHE. Liquid wastes that are known to meet disposal criteria will not require prior testing; however, liquid wastes of unknown character must be sampled and analyzed by a KDHE certified laboratory. Representative samples must be collected to ensure the disposal criteria are met.

Addition of recirculated leachate or landfill gas condensate do not require an RD&D variance or a special waste disposal authorization.

Liquid Collection, Storage, Handling, and Application

Facilities and/or equipment should be provided which will allow the collection, possible storage, and handling of the liquid. The MSWLF must ensure that incompatible liquids are not stored, handled, or applied together.

Acceptable liquids can be applied directly to the landfill. Collection, storage, and application records must be maintained for all liquids. Liquid application methods, quantities, and the location of each applied liquid should be identified and recorded.

Moisture levels

For each landfill unit to which liquids have been added, MSW moisture levels must be estimated to ensure that the moisture level does not exceed 40%. If the moisture level in the MSW exceeds 40% due to the addition of liquids, the landfill becomes subject to additional federal Clean Air Act regulations. The document "Example Moisture Mass Balance Calculations for Bioreactor Landfills" (EPA-456/R-03-007) presents two methods for estimating MSW moisture levels.

Preparation and Approval of an RD&D Plan

An MSWLF unit is eligible for an RD&D liquids restrictions variance if the unit has a leachate collection system which maintains a leachate depth of less than 30 centimeters (twelve inches) on the liner. Small landfills that have been granted an exemption from certain design criteria in accordance with [K.A.R. 28-29-103](#) are not eligible for a liquids restriction variance under the RD&D rule.

A facility may implement the RD&D rule after obtaining KDHE's approval of an RD&D plan in a letter from KDHE granting the variance. Proposed RD&D plans should consist of the following items:

Introduction and Project Description

The current status of the landfill operation should be described along with an overview of the proposed RD&D plan. The overview should include a description of the scope and goals for the proposed liquid additions. A timetable of operation with anticipated results, which can be compared with existing monitoring records and experience, should also be included in the plan.

Operations and Designs

Each operational aspect in the proposed RD&D plan should be defined and preliminarily designed using available and projected data. An approved plan will include all aspects of liquid addition which are supplemental to the existing facility operations plan. Operation and design areas include:

1. MSW and liquid receiving, handling, storage, and application rates;
2. Cover material requirements;
3. Leachate and landfill gas collection, treatment, and disposal;
4. Disease and vector control;
5. Surface and groundwater monitoring;
6. Site topography;
7. Geotechnical concerns;
8. Meteorological measurement capabilities and history; and
9. Possible corrective actions.

Monitoring and Data Evaluation

Measurements and frequency of measurements for various parameters should be proposed which will allow the effects of the RD&D effort to be evaluated. In addition to moisture levels, suggested areas of observation, measurement, and evaluation include:

1. MSW stabilization;
2. Quantity and quality of leachate and landfill gas emissions;
3. Temperatures of landfilled MSW;
4. Landfill emissions;
5. Surface and groundwater quality;
6. Density of MSW in the landfill;
7. Topography of the MSWLF;
8. Operational problems including seeps, ponding, and slope failures; and
9. Any corrective actions and results.

Forms and Recording Schedules

Appropriate forms and data collection schedules should be proposed to provide for the recording of information necessary for the evaluation and validation of the on-going RD&D effort.

Annual Report Requirements

The required annual RD&D report date should be identified along with the expected report content. Reports should present information, data, and conclusions to evaluate the performance of the RD&D effort relative to the goals of the proposed plan. The evaluation of the RD&D effort should include a detailed listing of recommendations regarding future plans.

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For additional information regarding proper management of solid or hazardous waste in Kansas, you may contact the Bureau of Waste Management at (785) 296-1600 or the address at the top of this document, or visit the Bureau's website at www.kdhe.ks.gov/Waste.